

Report for 2001NV4281B: Evaluation of Ecosystem Metabolism at Selected Sites in the Lower Truckee River Basin

There are no reported publications resulting from this project.

Report Follows:

Problem and Research Objectives:

The lower Truckee River of Nevada is a lotic ecosystem influenced by our societies uses of the Truckee River Watershed's water and land resources. The use of these resources often create point source and non-point source loadings of the lower Truckee River with materials (nutrients, water, pollutants etc.) that influence the biota and water quality (WQ) which are integral components of the lower Truckee river's ecosystem that has a specific targeted set of beneficial uses.

In order to monitor the lower Truckee River's water quality the Truckee Meadows Water Reclamation Facility and the Desert Research Institute has deployed water quality sensors throughout the lower Truckee River (LTR). These monitors are primarily utilized to determine if oxygen levels in the LTRiver reach threshold levels that may compromise the LTR's beneficial uses. This information also has been used to tune and validate WQ models of the LTR that are being developed and refined as tools for helping guide regulations and operations that will maintain the WQ of the LTR.

Recently, as part of the efforts to validate WQ models for the LTR, the stocks and dynamics of algal and macrophytes biomass has been assessed. The rationale for such monitoring is based on the premise that algae and Macrophytes are primary agents of oxygen consumption and production as well as nutrient transformations.

The monitoring and assessment of algal and macrophytes biomass in the LTR is an operation that requires hundreds of hours in the field as well as laboratory assessments of biological constituents. In addition, the deployment of personnel into the field presents risks to institutional resources and health. Therefore, we are seeking alternative measures as proxy's for monitoring plant biomass or biomass dynamics in the LTR. Models being constructed for the LTR are indirectly providing means for accomplishing this general objective through mechanistic nutrient accounting and hydrodynamics simulations. Another approach worth exploring is the relationship between oxygen dynamics that are a function of community metabolism and the measured biomass in the river during the same time periods. By determining if there are site specific relationships between algal or macrophytes biomass or biomass dynamics and community metabolism we will be able to evaluate if there is a means to provide a more direct and perhaps more synoptic method for monitoring biomass in the LTR that influences WQ, beneficial uses and ecosystem function during the future.

Methodology:

YSI sondes nominally consisting of probes for the determination of dissolved oxygen, temperature, pH and conductivity have been deployed from the bridges located at Mogul, East McCarren, Lockwood, Tracy/Clark, Painted Rock, Wadsworth, Dead Ox and Little Nixon along the LTR. TMWRF personnel have maintained these sondes since their deployment starting in 1985. The data collected from these sondes are available on the

web at www.tmwrf.com or by contacting TMWRF at 8500 Cleanwater Way, Reno, NV 89503.

DRI personnel also have deployed additional sondes deployed at five additional locations during the summer to autumn of 2001. Such deployments were made to make additional assessments of DO dynamics at sites not traditionally monitored by TMWRF- yet are integral to providing synoptic information for the LTR. These additional sites also have coincided with periphyton biomass monitoring projects for the Lower Truckee River that was accomplished by DRI, TMWRF and Washoe County personnel.

Streamflow data, necessary for community metabolism calculations, were used to determine the discharge, velocity, and depth of the lower Truckee River. The United States Geological Survey (USGS) monitor real-time streamflow with current meters for several sites along the Truckee River including at the North Truckee Drain at Spanish Springs Road near Sparks, Vista, near Tracy/Clark, below Derby Dam, at Wadsworth, and near Nixon. Streamflow data collected by USGS are available on the web at www.usgs.gov. Sites nearest to the areas where DO sensors were deployed are initially being used as proxies for discharge at these sites. Cross sections for discharge at the sites of the DO sensor deployments are being used to evaluate the USGS gauges as measure of discharge at the DO sensor sites.

Principle Findings and Significance:

To date the accomplishments for the project include the deployment and recovery of the DRI dissolved oxygen sensors during the summer of 2001. Additional deployments also occurred in the spring and early summer of 2002. TMWRF DO sensor data has been collected and all the data has been time stamped and collated with the respective USGS discharge data for the stream gages nearest to the areas where the DO sensors have deployed. Calculations of community respiration have been completed and additional computations for community photosynthesis are being undertaken.

Once the respiration and photosynthesis calculations are complete we will be comparing these with the periphyton biomass data to determine the number of sites that have comparable data on biomass and DO fluctuations. We anticipate that these data queries and calculations will be complete in the next month. This time frame will allow sufficient time to write a synthesis report and present our findings at upcoming water quality meetings regarding the Truckee River and the Arid West.